What is Claimed is:

1. A method for charging an output capacitor to a pre-determined output voltage level, said method using a capacitor charging circuit, said method comprising:

delivering power to the output capacitor;

when the output voltage level is equal to, or greater than, said pre-determined output voltage level, terminating power delivery and output voltage measurement to the output capacitor;

at a time period after said terminating, re-starting power delivery; and

determining the output voltage level based on the re-starting power delivery, wherein said determining further comprises temporarily activating circuitry that measures said output voltage level.

2. The method of claim 1 further comprising using an interrogation timer and a control latch to set the time period.

3. The method of claim 2, wherein said terminating comprises enabling the interrogation timer.

4. The method of claim 1, further comprising varying the time period wherein the output voltage level is below a fixed value.

5. The method of claim 4, further comprising incrementally increasing the time period when the

determining determines that the output voltage level is above the pre-determined output voltage level.

6. The method of claim 1, wherein said delivering power to the output capacitor further comprises charging said output voltage level until said output capacitor level is substantially equal to said pre-determined output capacitor level.

7. The method of claim 1, wherein said delivering power to the output capacitor comprises:

providing current to a primary winding of a transformer; and

using a secondary winding of the transformer to deliver power from the transformer to the output capacitor.

8. The method of claim 7, wherein said delivering power to the output capacitor further comprises:

using a primary winding current level to determine an ON-time portion of a power delivery switching cycle;

using a secondary winding current level to determine an OFF-time portion of the power delivery switching cycle; and

cycling between the ON-time portion and the OFF-time portion to charge the output voltage level.

9. The method of claim 7, wherein said delivering power to the output capacitor comprises:

adapting an ON-time portion of a power delivery switching cycle such that a primary winding current level increases to an equivalent peak primary current level during each ON-time portion of the power delivery switching cycle.

10. The method of claim 7, wherein said delivering power to the output capacitor comprises:

adapting an OFF-time portion of a power delivery switching cycle such that a secondary current level decreases to a minimum secondary winding current level during each OFF-time portion of the power delivery switching cycle.

11. The method of claim 1, wherein said time period is a pre-determined time period.

12. The method of claim 1, wherein said time period is an adaptable time period.

13. A capacitor charging circuit that maintains a pre-determined output voltage level with minimal power consumption, said capacitor charging circuit comprising:

power delivery circuitry that delivers power to the output of the capacitor charging circuit;

measuring circuitry that measures the output voltage level of the capacitor charging circuit;

control circuitry that is coupled to the measuring circuitry and that disables the power delivery circuitry and the measuring circuitry when the measuring circuitry determines that the output voltage level is at or above a pre-determined value, and that, when the power delivery circuitry and the measuring circuitry are disabled, periodically enables the power delivery circuitry and the measuring circuitry in order to determine whether the output voltage level is at or above the pre-determined value.

14. The capacitor charging circuit of claim 13, the control circuitry comprising an interrogation timer that periodically enables the power delivery circuitry and the measuring circuitry.

15. The capacitor charging circuit of claim 13, the power delivery circuitry comprising a transformer, the transformer including a primary winding and a secondary winding.

16. The capacitor charging circuit of claim 15, wherein the measuring circuitry determines the output voltage level based on a voltage on the primary winding.

17. The capacitor charging circuit of claim 15, further comprising an adaptive ON-time circuit that sets an ON-time portion of a switching cycle in the power delivery circuit and an adaptive OFF-time circuit that sets an OFF-time portion of the switching cycle.

18. The capacitor charging circuit of claim 17, wherein the adaptive ON-time circuit sets the ON-time portion based on a current through the primary winding and the adaptive OFF-time circuit sets the OFF-time portion based on a current through the secondary winding.

19. The capacitor charging circuit of claim 17, wherein the adaptive ON-time circuit sets the ON-time portion of a power delivery switching cycle for a first variable period of time, said first variable period of time is based at least in part on an inductance of the primary winding, on a supply voltage, and a peak primary winding current level, wherein said supply voltage is coupled to the primary winding.

20. The capacitor charging circuit of claim 17, wherein the adaptive OFF-time circuit sets the OFF-time portion of a power delivery switching cycle for a second variable period of time, wherein said second variable period of time is based at least in part on an inductance of the secondary winding, the output voltage, and on a secondary winding current level.

21. The capacitor charging circuit of claim 14, the control circuitry further comprising a control latch that enables the interrogation timer when the output voltage level is at or above the pre-determined value.

22. The capacitor charging circuit of claim 14, the control circuitry further comprising bias circuitry that enables said power delivery circuitry and said measuring circuitry when said interrogation timer times out.

23. The capacitor charging circuit of claim 15, further comprising a single current comparator that compares current in the primary winding during an ON-time portion of a switching cycle to a fixed current and terminates the ON-time portion of the switching cycle when the current in the primary winding is equal to or greater than the fixed current.

24. The capacitor charging circuit of claim 15, further comprising a single current comparator that compares current in the secondary winding during an OFF-time portion of a switching cycle to a fixed current and terminates the OFF-time portion of the switching cycle when the current in the secondary winding is equal to or less than the fixed current.

25. A method for using a single current comparator circuit to control an ON-time portion and an OFF-time portion of a switch, said method comprising:

comparing a primary winding current level in a transformer to a first reference current level to control said ON-time portion;

comparing a secondary winding current level in said transformer to a second reference current level to control said OFF-time portion.

26. The method of claim 25 further comprising:

cycling between said ON-time portion and said OFF-time portion of said switch, wherein said cycling is based on (1) said comparing said primary winding current level to said first reference current level and (2) said comparing said secondary winding current level to said second reference current level.

27. The method of claim 25, wherein said comparing a primary winding current level comprises determining when said primary winding current level exceeds said first reference current level so that said cycling can switch from said ON-time portion to said OFF-time portion.

28. The method of claim 25, wherein said comparing a secondary winding current level comprises determining when said secondary winding current level decreased below said second reference current level so that said cycling can switch from said OFF-time portion to said ON-time portion.

29. The method of claim 25, further comprising providing a positive feedback current to assist said cycling.

30. The method of claim 25, further comprising charging an output capacitor load using said current comparator circuitry to control power delivery to said output capacitor load.

31. A current comparator circuit that controls an ON-time portion and an OFF-time portion of a switch, said current comparator circuit comprising:

at least a first current source that provides a first reference current level;

at least a second current source that provides a second reference current level;

a transformer having:

a primary winding that provides a primary winding current level; and

a secondary winding that provides a secondary winding current level; and

current comparator circuitry that compares said first reference current level to said primary winding current level and compares said second reference current level to said secondary winding current level to control said ON-time portion and said OFF-time portion to charge a capacitive load.

32. The current comparator circuit of claim 31, wherein said circuitry comprises circuitry that determines when said primary winding current level exceeds said first reference current level so that said circuitry can cycle said switch from said ON-time to said OFF-time.

33. The current comparator circuit of claim 31, wherein said circuitry comprises circuitry that determines when said secondary winding current level decreases below said second reference current level so

that said circuitry can cycle said switch from said OFF-time to said ON-time.

34. The current comparator circuit of claim 31, further comprising feedback circuitry coupled to at least a third current source, wherein said feedback circuitry directs current from said third current source to assist said current comparator circuit when said switch cycles between said ON-time portion and said OFF-time portion.

35. The current comparator circuit of claim 34, wherein said feedback circuitry directs current from said third reference current source to assist said current comparator circuit when said switch cycles between said OFF-time portion and said ON-time portion.

36. The current comparator circuit of claim 31, further comprising one-shot circuitry coupled to said switch, wherein said one-shot circuitry maintains said OFF-time portion for a pre-determined period of time.

37. The current comparator circuit of claim 31, wherein said current comparator circuitry comprises a single current comparator.

38. A method for monitoring an output voltage level with minimal power dissipation, said method using measuring circuitry, said method comprising:

converting a primary voltage level of a primary winding of a transformer during an OFF-time portion of a power delivery cycle to a ground-referred voltage level;

comparing said ground-referred voltage level to a reference voltage level to determine if said output voltage level is at or above a pre-determined voltage level;

producing an output signal when said output voltage level is at or above said pre-determined voltage level; and

delaying said output signal for a pre-determined period of time at the beginning of each OFF-time portion of said power delivery cycle.

39. A measuring circuitry that measures an output voltage level with minimal power dissipation, said measuring circuitry comprising:

converter circuitry coupled to a primary winding of a transformer, said converting circuitry converts a primary winding voltage level to a ground-referred voltage level;

voltage comparator circuitry coupled to said converter circuitry, said comparator circuitry compares said ground-referred voltage level to a reference voltage level to determine if said output voltage level is at or above a predetermined voltage level; and

one-shot circuitry coupled to said comparator circuitry wherein said one-shot circuitry disables a comparator circuitry output signal for a

pre-determined period of time at the beginning of each OFF-time portion of a power delivery cycle.

40. A method for charging an output capacitor to a pre-determined output voltage level, said method using a capacitor charging circuit, said method comprising:

delivering power to the output capacitor;

when the output voltage level is equal to, or greater than, said pre-determined output voltage level, terminating output voltage measurement; and

at a pre-determined time period after said terminating, temporarily restarting circuitry that measures said output voltage level.